6.2 notes:

- ***Single blind:***
  - When the subjects (or researchers recording results) do not know which subject is getting which treatment

- ***Double blind:***
  - When ***both*** the subjects and the researchers recording the results don't know who is getting which treatment

**Try to use blinding if possible- reduces possible bias

Non-adherers:

* People who do not follow the treatment given to them

Example: people assigned to diets as part of an experiment. The subjects cheat on the diet, or do not follow it.

Dropouts:

* People drop out before experiment/study is over.
* Happens more often in longer experiments/studies

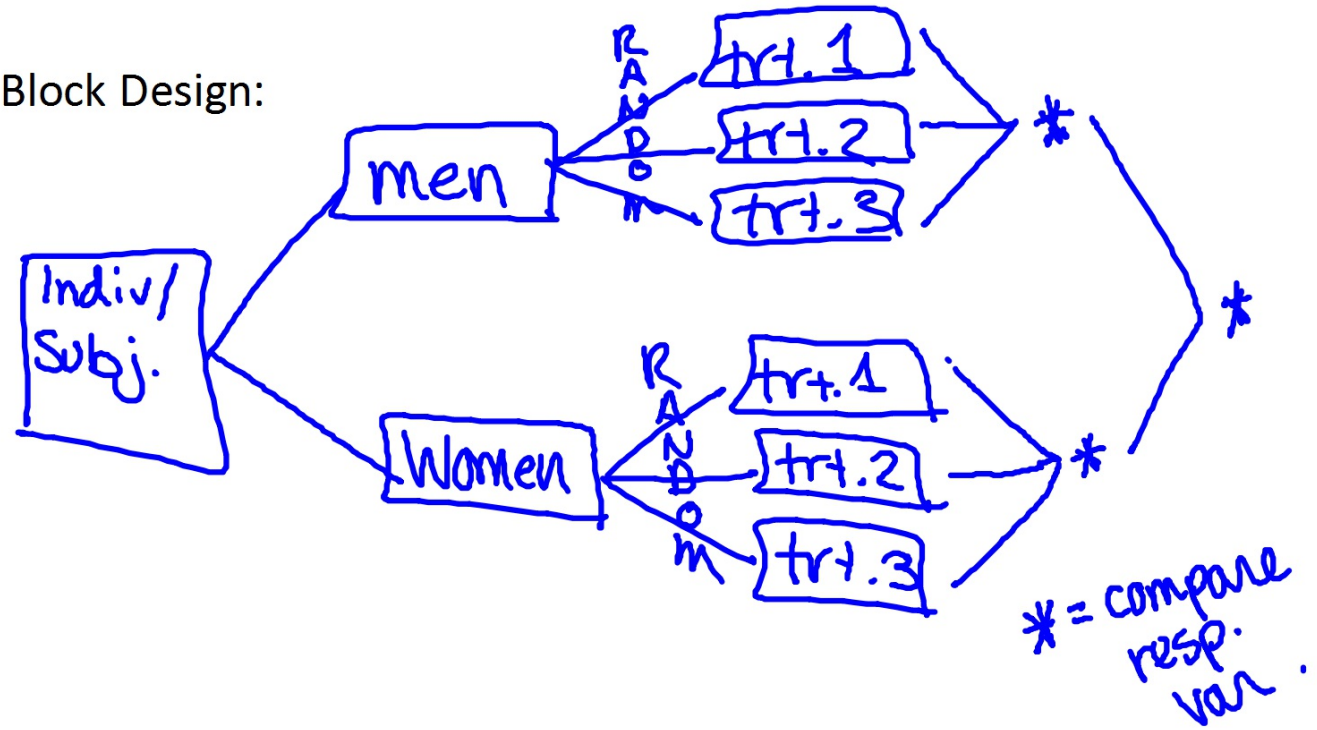
BLOCK DESIGN:

Block = group of individuals that have a similar characteristic.

Ex: gender, age

It is used to... Control lurking variable

Block Design:

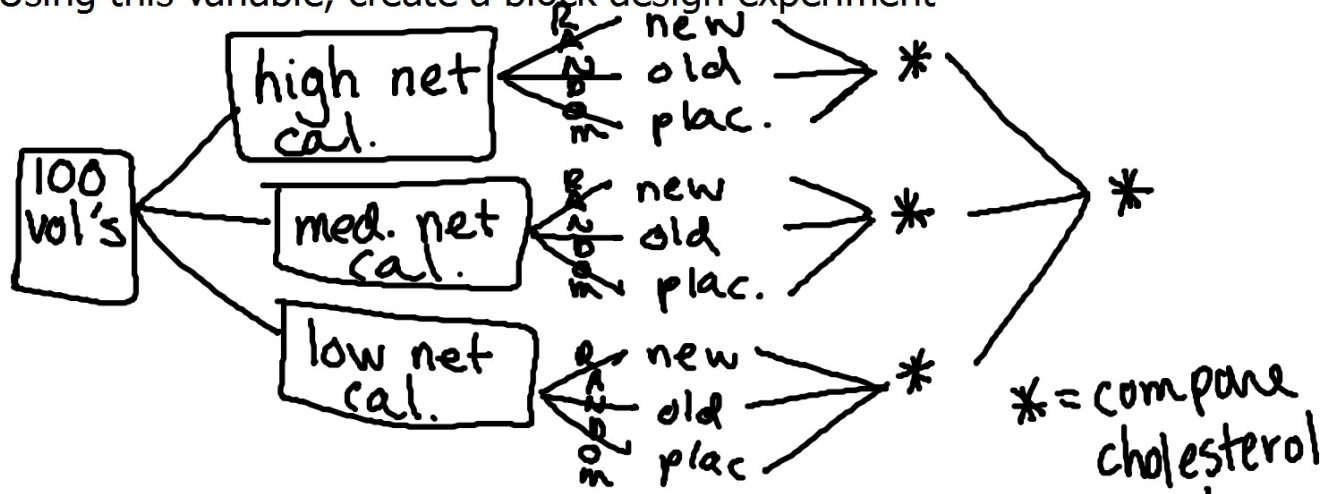


Example 1: Let's go back to the experiment on people with high cholesterol. We wanted to test the effect of new and old drug. We also thought a control group would be useful. There are 100 volunteers with high cholesterol that are currently not on meds that are available.

What are some lurking variables in this experiment?

diet & exercise, genetics, ~~gender~~, age

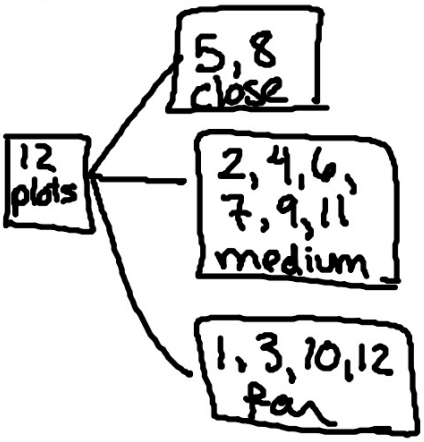
Using this variable, create a block design experiment

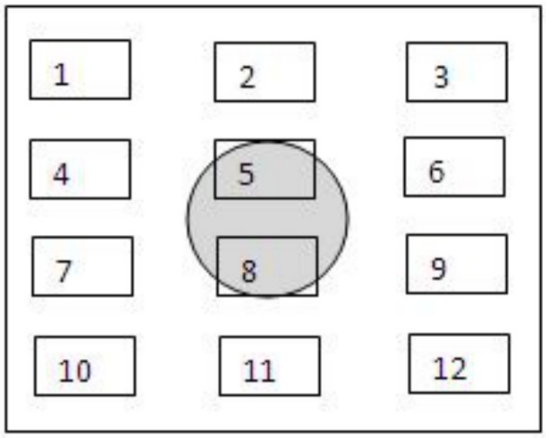


Could this experiment be done double-blind?

Yes

Example 2: An experiment to determine the effect of a fertilizer on the growth of grass is to be conducted in a controlled environment. Identical soil and seeds are placed in plots in the lab. Once the grass starts growing, some plots are to be treated with the new fertilizer, while the rest receive no fertilizer. All other conditions regarding water, temperature, etc. are identical, except for the proximity of the plots to the single light source in the room. The figure below illustrates this.



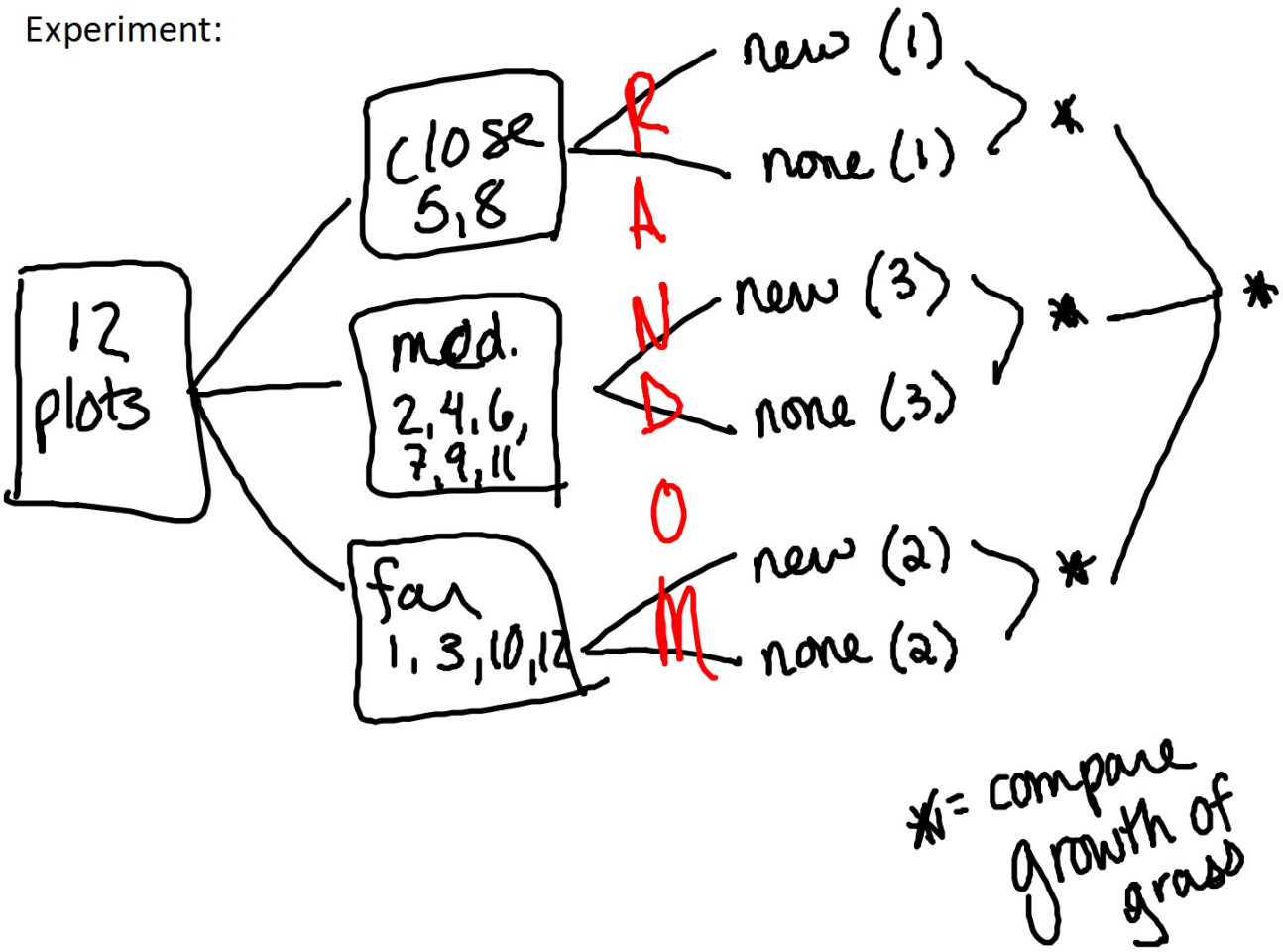


What is the lurking variable in this experiment?

light

Using this, design a block design experiment.

Experiment:

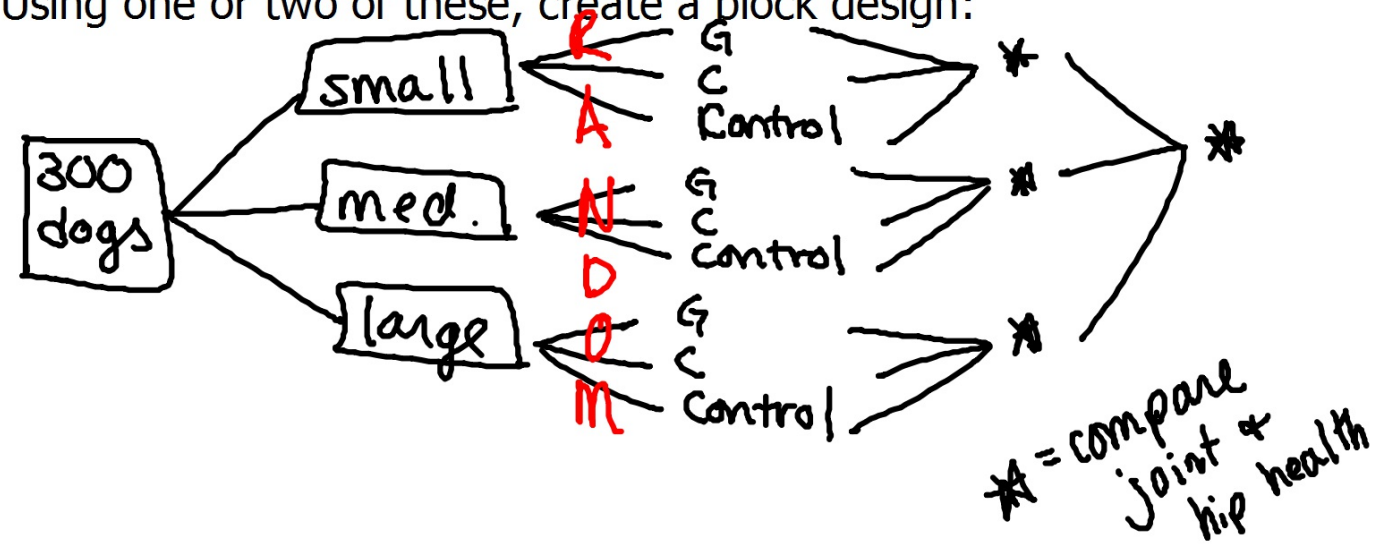

12 plots
close 5,8
med. 2,4,6, 7,9,11
far 1,3,10,12
RANDOM
new (1)
none (1)
new (3)
none (3)
new (2)
none (2)
*
*
*
*= compare growth of grass

Example 3: Let's go back to the dog example from before. We wanted to see if the drugs glucosamine and chondroitin had an effect on joint and hip health in dogs. We added a control group to the experiment too. We had 300 dogs (various breeds) from numerous clinics.

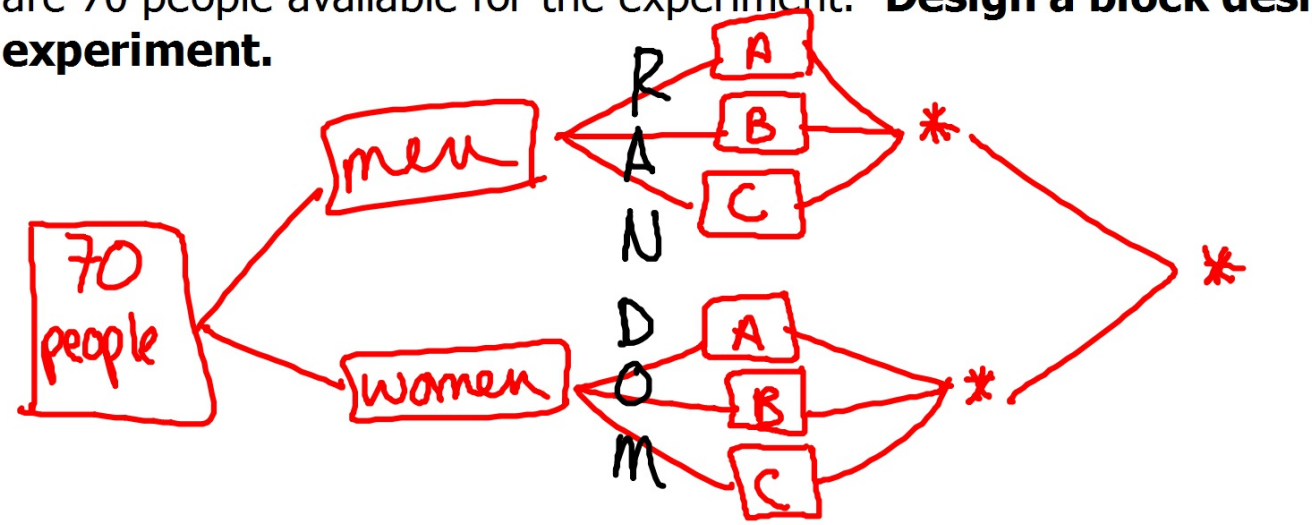
What are some lurking variables in this study?

Age, breed, level of activity

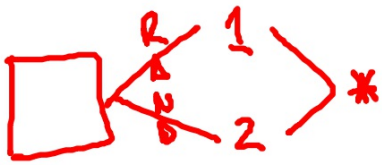
Using one or two of these, create a block design:



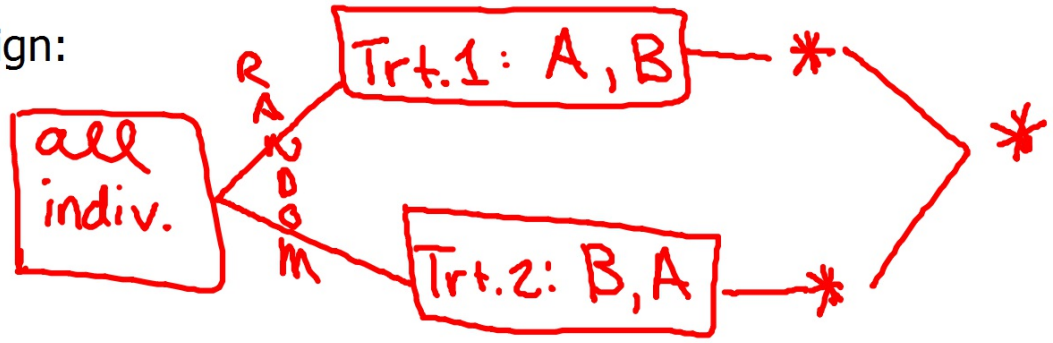
Example 4: Men and women respond differently to advertising. An experiment to compare the effectiveness of 3 TV commercials for the same product will want to look separately at the reactions of the different genders, and assess their overall responses to the ads. There are 70 people available for the experiment. **Design a block design experiment.**



Matched Pairs Design-

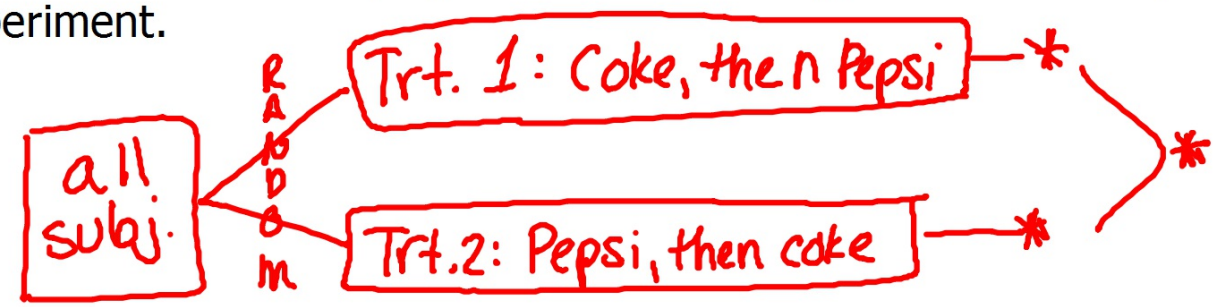


- Only… 2 treatments
- Every individual … gets both treatments
- Where is the randomization if everyone gets both treatments???
  Randomize which treatment the person gets 1st/2nd.
  Or Left/Right, or Front/Back
- Design:

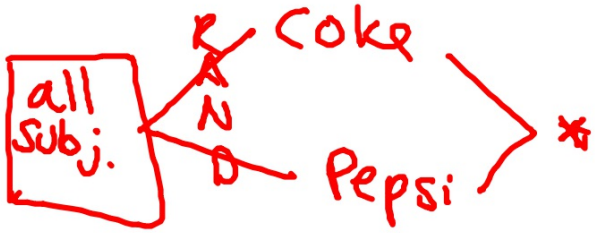


Example: Taste Test

We want to do a Coke/Pepsi Taste test. Design this matched pairs experiment.



CRD:



*=compare which liked better

Example 2: A manufacturer of boots plans to conduct an experiment to compare a new method of waterproofing to the current method. The appearance of the boots is not changed by either waterproofing method. The company recruits 100 volunteers in Seattle (where it rains a lot) to wear the boots as they normally would for 6 months. At the end of the 6 months, the boots will be returned to the company to be evaluated for water damage.

(A) What is the explanatory variable? Waterproofing

(B) What are the 2 treatments? new & current

(C) What is the response variable? water damage

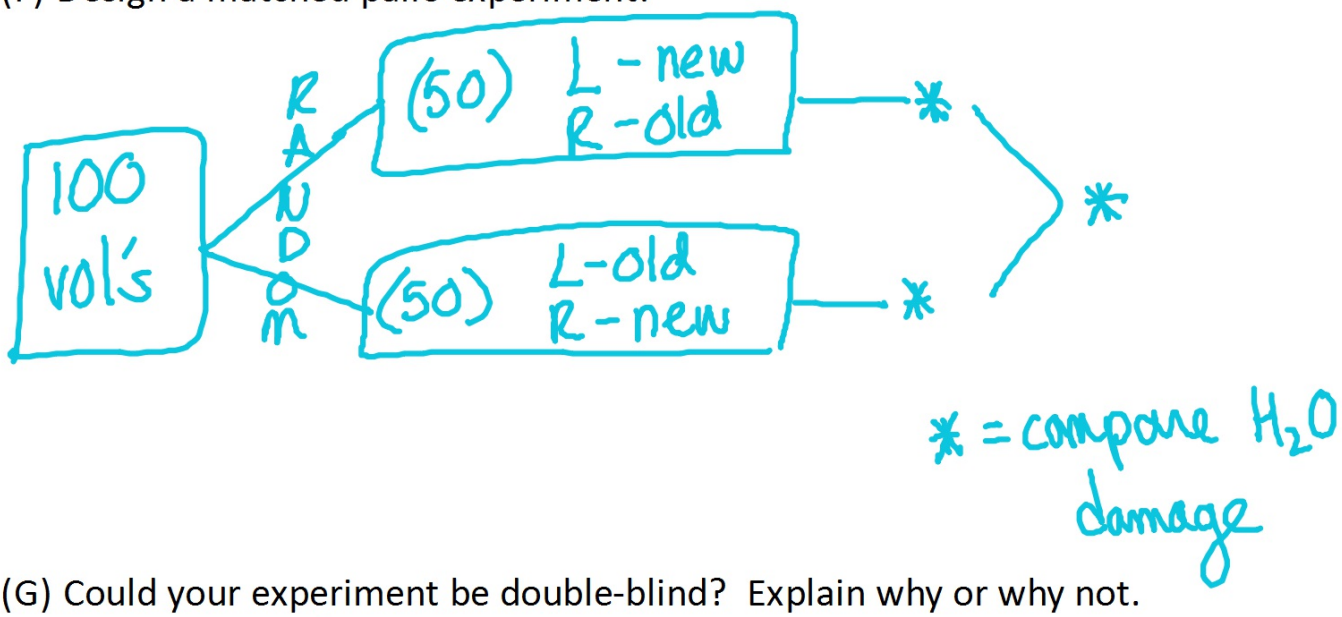
(D) Who are the individuals/subjects? 100 volunteers in Seattle

(E) How could each individual have BOTH treatments applied to them?

L/R 1st/2nd

Example 2 continued:

(F) Design a matched pairs experiment:



(G) Could your experiment be double-blind? Explain why or why not.

Yes, both subj. & researchers don't need to know who has which trt.

Example 3: Scientists are in search of a mosquito repellant that is more effective. To test the effectiveness of the new compound versus the current compound, scientists have randomly selected 100 people to participate in their experiment. 100 bins, each with an equal number of mosquitoes in them, are available for the experiment. After a repellant is applied to a subject's arm, they will insert their forearm into a bin for 1 minute. The number of mosquito bites on the arm after 1 min will be counted.

(A) What is the explanatory variable? mosquito repellant

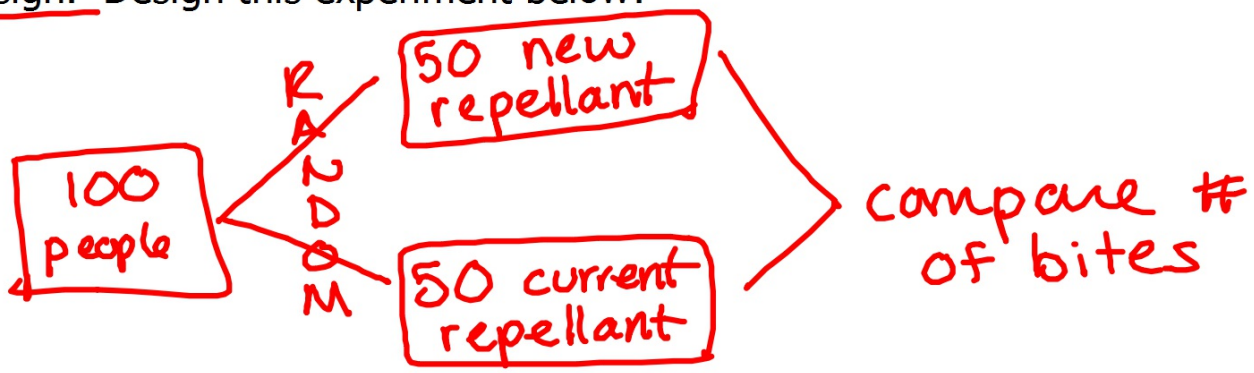
(B) What are the treatments? new and current repellant

(C) What is the response variable? # of bites on the arms

(D) Who are the subjects/individuals? subjects = 100 people

Example 3 continued:

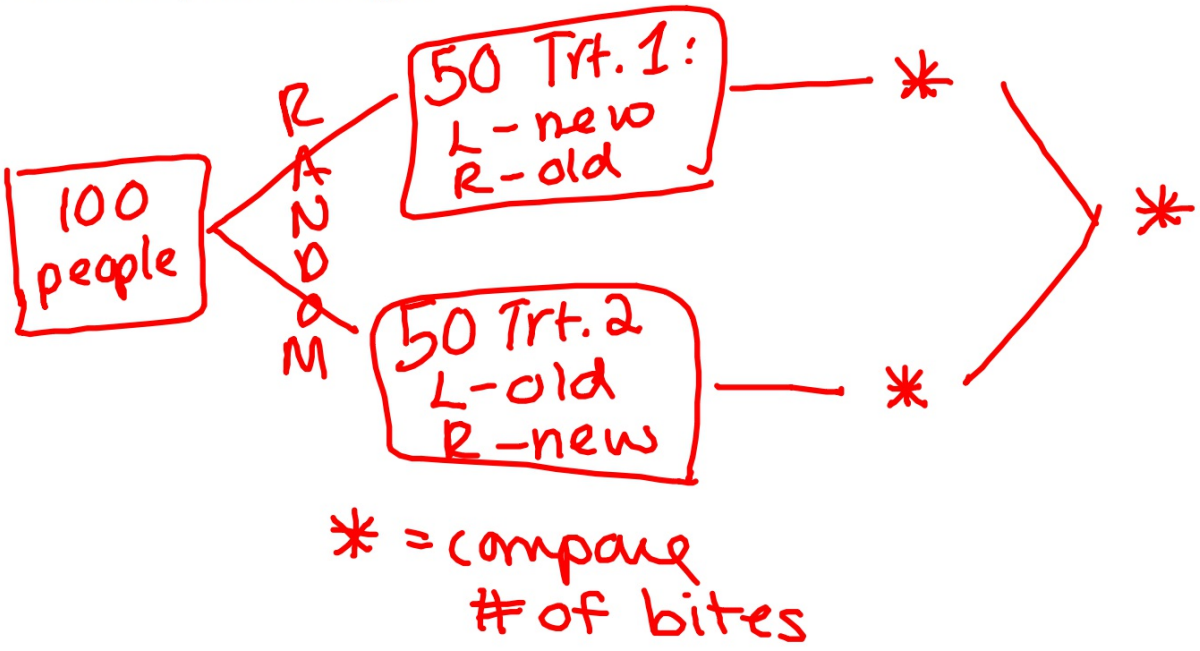
(E) Suppose this study is to be conducted using a completely randomized design. Design this experiment below:



(F) Suppose this study is to be conducted using a matched pairs design. How could each individual have BOTH treatments applied to them? one repellant on one arm, one on the other

(G) Design this experiment below:

Matched pairs design:



Example: Is the right foot more powerful than the left? A researcher decides to measure foot power by having subjects kick a large Styrofoam block and measure the depth of the impression. 40 subjects are available for the experiment.

(a) Identify a lurking variable dominant foot
foot sports, foot size, gender, stress level,

(b) Using this lurking variable, design a blocked, matched pairs experiment.